

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method for monitoring the health of a system, which comprises performing at each of a plurality of times the steps of:

constructing a condition signature for a present time from a plurality of condition indicators including (a) a plurality of vibration measurements acquired from said system or (b) one or more vibration measurements and one or more performance parameter measurements acquired from said system;

predicting a normal signature from a model defining one or more inter-dependencies between condition indicators used to construct the condition signature for a previous time, said normal signature corresponding to a condition signature for a healthy system at the present time, and said model comprising a matrix with one or more non-zero off-diagonal terms to define said inter-dependencies;

comparing said condition signature for the present time with said normal signature; and

registering an event if said condition signature for the present time differs from said normal signature by more than a predetermined threshold.

2. (Currently Amended) A method according to claim 1, wherein said model is ~~a-learn~~ learned model.

3. (Cancelled)

4. (Currently Amended) A method according to claim-3 1, wherein the step of comparing said condition signature with said normal signature involves calculating a value for the normalised innovations squared.

5. (Original) A method according to claim 1, wherein said model comprises a neural network.

6. (Original) A method according to claim 5, wherein the step of comparing said condition signature with said normal signature involves calculating a prediction error.

7. (Original) A method according to claim 1, wherein said times define successive intervals of at most 1 sec duration.

8. (Currently Amended) A method for monitoring the health of a system, which comprises performing at each of a plurality of times defining successive intervals of at most 1 sec duration the steps of:

constructing a condition signature for a present time from a plurality of condition indicators including (a) a plurality of vibration measurements acquired from the system or (b) one or more vibration measurements and one or more performance parameter measurements acquired from said system, said measurements being synchronously acquired from said system to a synchronization imprecision of at most 1 sec;

predicting, from condition indicators used to construct the condition signature for a previous time, a normal signature corresponding to a condition signature for a healthy system at the present time;

comparing said condition signature for the present time with said normal signature; and

registering an event if said condition signature for the present time differs from said normal signature by more than a predetermined threshold.

9. (Previously Presented) A method according to claim 8, wherein said normal signature is predicted from a model defining one or more inter-dependencies between said condition indicators used to construct the condition signature for the previous time.

10. (Currently Amended) A method according to claim 9, wherein said model is ~~a-learned~~ learned model.

11. (Original) A method according to claim 9, wherein said model comprises a matrix with one or more non-zero off-diagonal terms to define said interdependencies.

12. (Original) A method according to claim 11, wherein the step of comparing said condition signature with said normal signature involves calculating a value for the normalised innovations squared.

13. (Original) A method according to claim 9, wherein said model comprises a neural network.

14. (Original) A method according to claim 13, wherein the step of comparing said condition signature with said normal signature involves calculating a prediction error.

15. (Previously Presented) A method according to claim 1, wherein said measurements are synchronously acquired from said system to a synchronization imprecision of at most 1 sec.

16. (Previously Presented) A method according to claim 1, wherein said system comprises a gas turbine engine.

17. (Currently Amended) A data processing system for monitoring the health of a system, comprising:

data acquisition means for acquiring a plurality of condition indicators from said system at each of a plurality of times, said condition indicators including (a) a plurality of vibration measurements or (b) one or more vibration measurements and one or more performance parameter measurements;

processor means for constructing a condition signature for a present time from said condition indicators and for predicting a normal signature corresponding to a condition signature for a healthy system at the present time, said normal signature being

predicted by a model which defines one or more inter-dependencies between condition indicators used to construct the condition signature for a previous time, wherein said model comprises a matrix with one or more non-zero off-diagonal terms to define said inter-dependencies;

comparator means for comparing said condition signature for the present time with said normal signature; and

registration means for registering an event if said comparator for the present time indicates that said condition signature differs from said normal signature by more than a predetermined threshold.

18. (Currently Amended) A data processing system for monitoring the health of a system, comprising:

data acquisition means for acquiring a plurality of condition indicators from said system at each of a plurality of times defining successive intervals of at most 1 sec duration, said measurements being synchronously acquired from said system to a synchronization imprecision of at most 1 sec, and said condition indicators including (a) a plurality of vibration measurements or (b) one or more vibration measurements and one or more performance parameter measurements;

processor means for constructing a condition signature for a present time from said condition indicators and for predicting, from condition indicators used to construct the condition signature for a previous time, a normal signature corresponding to a condition signature for a healthy system at the present time;

comparator means for comparing said condition signature for the present time with said normal signature; and

registration means for registering an event if said comparator for the present time indicates that said condition signature differs from said normal signature by more than a predetermined threshold.

19-21. (Cancelled)

22. (New) A method for monitoring the health of a system, which comprises performing at each of a plurality of times the steps of:

constructing a condition signature for the present time from a plurality of condition indicators including (a) a plurality of vibration measurements acquired from said system or (b) one or more vibration measurements and one or more performance parameter measurements acquired from said system, said measurements being synchronously acquired from said system to be a synchronization imprecision of at most 1 sec;

predicting a normal signature from a model defining one or more inter-dependencies between condition indicators used to construct the condition signature for the previous time, said normal signature corresponding to a condition signature for a healthy system at the present time;

comparing said condition signature for the present time with said normal signature; and

registering an event if said condition signature for the present time differs from said normal signature by more than a predetermined threshold.

23. (New) A data processing system for monitoring the health of a system, comprising:

data acquisition means for synchronously acquiring a plurality of condition indicators from said system at each of a plurality of times to a synchronization imprecision of at most 1 sec, said condition indicators including (a) a plurality of vibration measurements or

(b) one or more vibration measurements and one or more performance parameter measurements;

processor means for constructing a condition signature for the present time from said condition indicators and for predicting a normal signature corresponding to a condition signature for a healthy system at the present time, said normal signature being predicted by a model which defines one or more inter-dependencies between condition indicators used to construct the condition signature for the present time;

comparator means for comparing said condition signature for the present time with said normal signature; and

registration means for registering an event if said comparator for the present time indicates that said condition signature differs from said normal signature by more than a predetermined threshold.